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AUTHOR	Tweeten, Luther
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ABSTRACT

Measures such as years of school completed, functional illiteracy, grade retardation and percent of youths attending college indicate that schooling attainment in nonmetro areas falls short of that in metro areas. However, this is not to say that rural children on the average attend inferior schools or rank low in schooling attainment, for the discrepancies largely disappear when adjustments are made for migration patterns and the lower socio-economic status of rural students and parents. Deficiencies in rural schools are primarily concentrated in low income areas and among minorities. School quantity and quality can be improved through federal development of remedial programs, student retention programs, and supplementary funds. Additional schooling could enable white rural males to close the gap between their earnings and the amount earned by their metro counterparts. However, for females and black males, education alone would not reduce the large shortfalls in earnings; public policy must also focus on ending race and sex discrimination in jobs, on job creation in depressed rural areas, and on improved methods of funding schools. Progress in schooling attainment depends on the socio-economic position of parents and communities. Improving education alone is not sufficient to provide solutions to rural poverty and underemployment. Job development and expansion of the economic base are needed along with investments in human Resources. (Author/DS)

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RURAL EDUCATION AND RURAL DEVELOPMENT

by

Luther Tweeten*

Declining attention of social scientists to rural development and rural education in recent years has been coincidental with diminishing public support for rural development. An important reason for diminishing attention to rural development is the demographic transition evident in higher rates of employment and population growth in rural than in urban areas and in the more rural Sunbelt than in the more urban Frostbelt. The demographic transition has been characterized by central city decay and fiscal problems leading to pressures for public officials to respond to the problems of cities. In addition the "food crisis" of 1973-76 followed by the farm protest movement of 1977-79 diverted attention of rural legislators, who have traditionally supported rural development, to resolving farm and food problems. The realignment of public priorities away from rural development is unfortunate. Data presented in this report reveal that the need for rural development remains urgent.

The principal objective of this paper is to assess the role of education in rural development. A case is made for education as an integral part of a national growth policy. The part that can be played by the federal government in such a policy is adumbrated.

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*Regents Professor, Department of Agricultural Economics, Oklahoma State University, Stillwater. Comments of Gerald Doeksen, James Nelson and Daryll Ray were very helpful; the author is solely responsible for shortcomings of this report.

Before confronting more substantive issues, it is well to define some terms used herein. Rural refers to micropolitan areas comprised of nonmetropolitan areas and of small towns and open country within metropolitan areas. Because data are frequently reported for nonmetropolitan areas, this more narrow definition is sometimes used and identified accordingly. Rural development is defined as an increase in the well-being of rural people, wherever they eventually reside. Education as used herein is largely confined to the role played by elementary and secondary schools in imparting cognitive and other skills to prepare youth for adult roles in society. Some consideration also is given to college and vocational-technical education.

THE SOCIO-ECONOMIC SETTING

Special attention to rural education and development is motivated by unique social, economic and demographic characteristics of such areas. These are summarized below (see Tweeten, 1978, p. 3-8; and June, 1978, pp. 2-5 for original sources of data):

(1) After decades of decline, farm employment and population show signs of stabilizing. Annual net migration from farms averaged 5.3 percent from 1950-60, 5.6 percent from 1960-70, but only 2.1 percent from 1970 to 1975. While the great farm-urban exodus is over and no huge reservoir of underemployed labor remains in farming, labor-saving technology continues to release labor from agriculture. The presence of large numbers of uneconomic size farming units and emerging technologies that increase economies of farm size portend a decline in farm numbers for some years to come. With a depressed farming economy and growing nonfarm economy in 1976, farm population fell by 6.9 percent, the highest rate in a decade. This

rate will not be sustained but does emphasize that education and employment programs that enhance ability of human resources to make adjustments are of continuing importance.

(2) The farming industry provides the economic base to support many rural communities. But farmers receive considerably more net income from off-farm than from farm sources. No more than one-fifth of the nonmetropolitan work force numbering 30 million workers derives its livelihood either directly or indirectly from the farming industry. The economic destiny of rural areas depends more on trends in nonfarm industries than in the farming industry.

(3) It was apparent in the early 1970's that rural employment was diversifying with significant growth of government, services, and trade. New rural growth industries emerged in retirement and recreation activities and in expansion of 4-year colleges and their communities.

(4) Expansion of job opportunities has led to population flow into nonmetropolitan areas for the first time in the history of the nation. In the first half of the 1970's, nonmetropolitan population increased 6.6 percent compared with metropolitan growth of 4.1 percent. During roughly the same period, nonmetropolitan areas absorbed 40 percent of the total increase in nonfarm employment, expanding slightly their share of total employment to over 25 percent. The recent rapid nonmetropolitan growth is not explained by rates of natural increase (excess of births over deaths). Instead, it stems from 1.8 million net immigration over the 5-year period. In contrast, these same areas experienced 3.0 million net out-migration in the 1960-70 decade as a whole.

(5) It is notable that growth has occurred both in the nonmetropolitan counties that adjoin metropolitan areas (and are influenced by such proximity),

and in those that are more remote from metropolitan influence. Yet, the nonmetropolitan growth trend cannot be generalized as renewed growth of small towns, many of which continue to decline in population. The turnabout is most pronounced in the open country and highway corridors in many areas. Even counties in the Corn Belt with no total population growth are having internal redistribution, with more people in the countryside and fewer in towns.

On the whole these trends have been beneficial. But the benefits by no means have been universally shared. Some areas and some groups have not improved their well-being. Unintended and unwanted effects of growth and dispersion have become evident in cities and in rural areas. Some areas have encountered serious problems in managing population and economic growth. Poverty, low income, and underemployment continue to characterize many rural residents as apparent below:

(1) Median family income has been rising faster in nonmetropolitan areas than elsewhere, but was 22 percent below the metropolitan level in 1975--$11,600 versus $14,909. Lower costs of living in nonmetropolitan areas account for some but not for all of the shortfall.

(2) The poor are disproportionately concentrated in rural areas. Almost one in every six persons in nonmetropolitan areas is poor, compared with one in nine for metropolitan areas. Furthermore, the depth of poverty among the poor in nonmetropolitan areas is greater as measured by the difference between actual income and the poverty threshold. The "working poor" are especially prominent in nonmetropolitan areas--half the poor there hold jobs. These individuals especially can benefit from education and training programs to upgrade their earning power, a special need because, as jobholders, they are ineligible for most welfare programs.

(3) Nonmetropolitan poverty is concentrated in some regions (60 percent in the South) and among some racial and ethnic groups, especially Indians, blacks and Hispanics. Areas of intensive poverty remain despite substantial economic progress. Examples include the crescent extending from the Coastal Plains of the southeast through the Black Belt of Alabama to the Mississippi Delta.

(4) The incidence of farm poverty declined dramatically from one-half of persons on farms in 1960 to one-sixth of persons on farms in 1975. Though the majority of farm poor operate small farms, and receive little income from farming, the majority of small farmers are not poor because they receive substantial income from off-farm sources.

(5) Increased mobility and expanding urban influences have enhanced access to job opportunities for rural people, but the economic base for many rural communities continues to be narrow. Areas with a narrow economic base are particularly sensitive to changes affecting a particular industry or firm.

(6) Wage levels in rural areas are often low. Roughly 40 percent of manufacturing employment in rural areas was concentrated in relatively low-wage, labor-intensive industries in 1969; and, from 1969 to 1972, about 45 percent of jobs in new plants were in such industries. Some of these jobs have been filled by second wage earners to supplement family income, but most are occupied by household heads with attendant continued poverty for many full-time workers in rural areas.

(7) In 1970, labor force participation rates were 73.8 percent for males and 41.1 percent for females in nonmetropolitan areas compared to 77.5 percent for males and 43.4 percent for females in metropolitan areas.

(8) Nonmetropolitan areas are characterized by high incidence of self-employed, casual and unpaid family labor. In 1976, 12.6 percent of total nonmetro employment was self-employment, compared to only 6.5 percent in metro areas. These characteristics coupled with high incidence of seasonal and migratory employment tend to result in high underemployment as opposed to unemployment and leave rural areas disadvantaged in funding of federal work force programs which are allocated on the basis of unemployment rather than underemployment. In 1970, the rate of unemployment was similar (4 percent) in metro and nonmetro counties, but underemployment was 18 percent in metro counties and 25 percent in nonmetro counties. Rural areas are also characterized by low incidence of participation in social programs including unemployment insurance, minimum wage coverage and disability insurance.

(9) The dependency rate, defined as the proportion of population under 18 and 65 or more years of age divided by the population 18-64, was 77.1 percent in metropolitan and 86.5 percent in nonmetropolitan counties in 1970. Coupled with low income, high dependency rates (high proportion of very young and elderly) strain the economic base of many rural areas in providing adequate educational, health, housing and other services. In 1950, 59 percent of the occupied housing in nonmetropolitan areas was substandard. This percentage had declined to 15 percent in 1970 and to 8 percent in 1975. Comparable figures for metropolitan areas were 22 percent in 1950, 6 percent in 1970, and 4 percent in 1975.

(10) Low density of population in many rural areas precludes economies of size in provision of public services, including schooling.

Extensive data (Fratoe, 1978, pp. 24-25) comparing educational characteristics by sector showed that nonmetro residents were more likely than

metro residents to attend public schools that spend less for instruction, to enroll in school later, to progress through school more slowly, to complete fewer years of school, to score lower in national assessment tests and to be classified as functional illiterates. Nonmetro residents were less likely to attend public schools with supportive services and personnel, to complete four years of high school or more, to plan a college education, to enter college, to receive vocational training, and to enroll in adult educational programs.

Fratoe (1979), examining changes in farm and nonfarm measures of educational attainment from 1968-1975, found that white farm males and females have made substantial progress in reducing their educational shortfall behind their nonfarm counterparts. Schooling attainment of white farm females had nearly reached that of nonfarm females by 1975, although white farm males continued to lag metro and nonmetro males by 1.2 and .8 years of schooling, respectively, in 1975. The figures for blacks were distressing. Black farm males did not improve their educational levels relative to their metro counterparts and trailed in schooling attainment by 5.7 years in 1975. The gap was 4.0 years for black women. The functional illiteracy rates for black farm males remained about the same (40 percent) while illiteracy among black farm females actually rose from 23.1 percent to 31.9 percent between 1968 and 1975.

THE FEDERAL RESPONSE

The foregoing data build a strong case for larger federal outlays per capita to fill socio-economic needs in nonmetropolitan counties than in metropolitan counties. Data on federal outlays in Table 1 raise serious doubts concerning the federal commitment--outlays per capita were $306 higher

Table 1. Federal outlays per capita for U. S. metropolitan and nonmetropolitan counties, fiscal year 1976.

	Metropolitan counties	Nonmetropolitan counties
	Dollars per capita	
Human resource development	786	742
Public assistance, social security, rehabilitation	524	540
Health payments and services	163	130
Education	52	51
Manpower training and employment opp.	47	21
Housing	105	59
Community and industrial development	132	153
Agriculture and natural resources	23	90
Defense and space	486	219
Justice and law enforcement	9	3
General functions and government admin.	32	5
Total	1,577	1,271

Source: Reid et al. (1978, pp. 13, 14).

per capita in metro counties than in nonmetro counties in 1976. Defense and space outlays strongly favored metro counties but may be allocated according to efficiency (procuring products at lowest cost) rather than need criterion. Similarly, agriculture and natural resource outlays to some extent are allocated on a basis other than need. Subtracting these two categories, the remaining categories which are expected to be more heavily based on need showed a shortfall of over $100 per capita in nonmetropolitan counties.

Some categories such as housing show glaring deficiency in relation to need. For this paper, the greatest concern is for human resource development outlays which favored metro areas. Larger nonmetro than metro outlays per capita would seem warranted based on needs depicted earlier. Outlays for education were nearly identical for the two sectors. Manpower training and employment outlays were very low in nonmetro counties, but the difference in funding between sectors is at least partly explained by advantages of locating training and employment service facilities in metro areas to realize economies of operation and serve nonmetro and metro people. This factor does not explain why federal outlays per capita for education were less for nonmetro counties.

Other data comparing education outlays by sector are more grim. Fratoe (1978, p. 10) reported federal outlays in 1972-73 of $133.33 per metro-central student, $55.77 per metro-suburb student and $91.10 per nonmetro student. Federal outlays per student in public school systems were highest in the Southeast region, hence were allocated to some degree according to need. However, within-state allocations were not necessarily related to need as apparent later in this paper for Oklahoma. Nonmetro public schools spent less from all sources per student than metro central or suburban public schools in all categories except student transportation during 1972-73 (Fratoe, 1978, p. 9).

ROLE OF EDUCATION IN RURAL DEVELOPMENT

Rural development was defined earlier as an improvement in the well-being of rural residents, wherever they eventually reside. It follows that education contributes to rural development to the extent that it improves well-being.

Tweeten and Lu (1976) and Harper and Tweeten (1977) found socio-psychological measures of well-being perceived by individuals to be significantly increased by additional education, income and occupation as measured by socio-economic status. Well-being was also significantly influenced by age, sex and race but, interestingly enough, not much by place of residence. Some evidence pointed to a slight advantage in well-being for rural SMSA and small city (2,500-9,999 population) residence, others things equal. Income and occupation are influenced by education, and much of this section focuses on the impact of education on well-being of individuals and communities through intermediary variables, mainly income level and distribution. The extent to which schooling can be a successful instrument of public policy to reduce the gap in income and other dimensions of well-being between metro and nonmetro areas depends on the shortfall of education in nonmetro areas and ability of additional schooling to reduce disparties in economic performance between sectors.

Education in Micropolitan Areas

Median years of school completed by white males 25 years of age and older in 1975 was 12.6 for metro, 12.2 for nonmetro nonfarm and 11.4 for nonmetro farm residents (Fratoe, 1978, p. 14). Differences in years completed for white females among sectors was less and inconsequential. From 1970 to 1975, median years completed increased .2 years for metro

and nonmetro nonfarm white males but increased 1.3 years for farm white males.

The data are far less reasurring for minorities and low-income regions. Median years of school completed by persons 25 years of age and older for blacks was 11.6 for metro males, 8.1 years for nonmetro nonfarm males and 5.9 years of nonmetro farm males in 1975. Differences among sectors were substantial also for black females, although not as large as for black males. Median years of school completed by Hispanic, metro males 25 years of age or older in 1975 was 10.6 for metro residents and 7.3 for nonmetro residents.

For persons 25 years of age or older in 1970 in low income rural counties in the South, median years of school completed was in many counties 3 years below the national figure, functional illiteracy rates (percent with less than 5 years of schooling) several times the national average of 5.5 percent, and percent of persons with a college education was frequently half the national average of 10.7 percent (cf. Cosby and Charner, 1978, p. 52). The conclusion is that educational attainment is indeed a serious problem in micropolitan areas, but is centered primarily among minorities and in low income areas.

Nonmetropolitan residents clearly lag behind metropolitan residents in median years of schooling attained. Patterns for blacks are similar among sectors, although attainment is lower in all cases than for whites. Much of the difference in schooling attainment among sectors vanishes when a correction is made for migration of micropolitan residents to the metropolis (see Hines and Tweeten, 1968, p. 1428) and for socio-economic background of students. Differences are not attributed to an overall lower quality of schools in micropolitan areas.

Based on extensive data from the Equality of Educational Opportunity Survey (EEOS) Project Talent and other sources, Jencks (1972, p. 90) concluded, "Once socioeconomic and racial background had been taken into account, schools in these various types of communities [inner city, residential suburban, small town, etc.] all scored within a month of one another in achievement." Armor (1972) examined differences between metropolitan and micropolitan schools in teachers' salaries, student verbal achievement, and socio-economic background. Comparing white students only, those in metropolitan areas ranked considerably higher than those in micropolitan areas in the several measures of socio-economic background. Yet, students in the two areas showed very little difference in verbal achievement scores. However, black students scored substantially below white students in both sectors.

Some comparison in schooling between rural and urban sectors also can be made using data from a 1970 stratified random sample of 5,946 students from grades 4, 8, and 11 attending Oklahoma public schools (Tweeten et al. 1974). Although Oklahoma ranks low among states in teacher salaries, composite achievement scores in each grade were very near national norms. Students were divided into four residence groups. Those from a farm or ranch and those from towns up to 2,500 had nearly identical composite achievement scores. And those from cities of 2,500 to 10,000 and those from cities of over 10,000 had nearly identical composite achievement scores. However, the average composite achievement score was 13 percent higher for the latter two urban than for the former two rural groups in grade 4, narrowing to 9 percent higher in grade 11. After the data were adjusted for differing income and education of parents, student achievement differences between sectors vanished. While both farm and rural nonfarm adult residents in Oklahoma average below urban adult residents in median schooling, the difference appears to arise

primarily because persons who attain the most schooling leave rural areas rather than because rural youth underachieve in school or attend inferior schools.

Christiansen, et al. (1975) examined elements that determine attending college based on data from Wisconsin high school seniors in 1963 and a follow-up study four years later. After correcting for class rank and IQ of the student, availability of college facilities and education and income of parents, the probability of the son of a farmer attending college was somewhat higher than that of a son of a skilled, unskilled or service worker attending college. Similar results were obtained for daughters of farmers.

Mare (1977) estimated the impact on school progression of the number of occupational variables based on the 1973 Occupational Changes in a Generation Survey, a supplement to the March 1973 Current Population Survey which had a target population of U. S. male civilian non-institutional population age 20-65. Based on data on approximately 33,500 men, being from a farm slightly reduced rates of completing the elementary school and attending high school given completion of elementary school. However, once enrolled in high school, the probability of completing high school and higher levels of educational attainment were raised by being from the farm (p. 21).

Not all aspects of micropolitan schooling are rosy, and major problems are apparent. One is the lack of schooling achievement and presence of high dropout rates in depressed areas and among minorities. Comparing two Oklahoma areas that are totally nonmetropolitan, median composite achievement in the northwest exceeded that of the economically depressed southeast by 8 percent in grade 4 and by 13 percent in grade 11 in 1970.

Most distressing is the wide gap between whites and blacks. Verbal achievement scores were consistently lower for the U. S. South than for

other regions based on EEOS data (Armor 1972, pp. 200 ff.). The situation is especially critical for blacks in the South: those attending sixth grade in all-black, nonmetropolitan schools scored an average of 20 on the verbal achievement test compared to 33 for whites attending all white schools. Mean verbal achievement scores for the same grade in the metropolitan United States were 25 for blacks attending black schools and 37 for whites attending white schools. Even if most of these differences disappear after adjusting for socio-economic background of students and migration, they are still a matter of concern. Clearly we would like to invest in schooling to raise incomes of nonmetropolitan persons, particularly those with low incomes. The question is how to allocate resources to improve well-being. Is additional investment in schooling justified by the economic and social payoff?

Schooling as an Investment

Research cited earlier showed that schooling is in no small part a consumption good which contributes directly to well-being. But society does not widely subsidize goods used only for consumption of those who can pay their own way. Schooling is also a production good which generates a flow of future earnings and economic growth. For economic growth and efficient use of limited funds, schooling investments must provide positive rates of return, i.e. benefits in excess of costs. For best use of resources, investment in schooling is pursued to the point where rates of return from added investment in schooling generates rates of return in line with rates on alternative investments.

Carnoy and Marenbach (1975) provide the most comprehensive estimates of rates of return on schooling investment over time. They estimated private rates of return (based on pecuniary costs and benefits to the student

and his family) and social rates of return (based on public and private costs and returns) to schooling by race, sex and schooling level for the U. S. using census data from 1939 to 1969. A most remarkable finding is that social rates of return have held up over time despite massive increases in the supply of human capital. For white males, unadjusted social rates of return for college over high school were 11 percent for each of the years 1939, 1949, 1959 and 1969! Unadjusted social rates of returns for college over high school in 1969 were estimated to be 8 percent for black males, 9 percent for white females and 10 percent for black females. These rates increased from earlier decades, suggesting a trend toward an economic optimum of approximately 10 percent--a typical return on nonhuman capital investments in the economy. Unadjusted private rates of return in 1969 for completion of college versus high school ranged from 14 to 20 percent for the various race-sex groups. Social and private rates of return were higher for elementary and secondary schooling than for college. The overall social rate of return for elementary, secondary and college schooling investment dropped from an estimated 14 percent in 1939 to 9 percent in 1969, a trend expected with relatively more schooling resources devoted over time to higher education and to minorities which receive lower rates of return than other categories.

Several studies (cf. Hauser and Baymont, 1977; Akin and Garfinkle, 1974; Tweeten, 1970, Ch. 5) using samples for other geographic locations and time periods report results broadly consistent with those reported above It is notable that despite market distortions and externalities (consumption benefits of schooling exceed private pecuniary benefits, social pecuniary benefits exceed private pecuniary benefits and social costs exceed private costs), the allocation of resources to schooling is near an economic

optimum on the average based on rates of return on alternative investments in the economy. Schooling decisions do respond to economic incentives: Freeman (1975) found that college enrollment declined in response to lower salaries, reduced job opportunities and to falling rates of return on investment in a college education from 11-12 percent in the early 1960's to about 8 percent in the early 1970's.

The above rates of return were not adjusted for mortality, ability, internal rate of return on school property, non-pecuniary benefits and secular growth in earnings due to interaction of schooling with non-schooling related growth sources such as research. Adjustments by Hines et al. (1970, p. 334) for ability sharply dropped rates of return but were offset by adjustments for other factors, leaving adjusted and unadjusted rates of return somewhat comparable in magnitude. The authors' adjustment for ability lowered earnings differentials between high school and elementary school graduates to 40-64 percent of the unadjusted rates and between college and high school graduates to 60-88 percent of the unadjusted rates. More recent data by Taubman (1976, p. 4) based on genetic and environmental effects estimated from a sample of 2,478 pairs of twins approximately 50 years of age indicated that failure to control for genetics and family environment could bias upward education benefit estimates by up to two-thirds. Duncan (1976, p. 481) estimated that failure to account for non-pecuniary returns from schooling could bias downward the estimated returns from schooling by 10-25 percent. Hines et al. did not adjust for the latter and underadjusted for ability based on the Taubman data. Adjustment of the Hines et al. estimates for <u>both</u> ability as measured by Taubman and non-pecuniary benefits as measured by Duncan leaves net rates of return essentially unchanged.

Rates of Return on Schooling for Low Income Areas and the Disadvantaged Schooling costs and contributions to earnings are less for people residing in rural areas and on farms than for residents of other areas. These two impacts on rates of return partially offset each other, leaving rates of return for rural white males roughly comparable to those of urban white males. Using 1959 data, social rates of return for high school were nearly 14 percent for rural nonfarm white males and 8 percent for rural farm white males (Tweeten and Brinkman, 1976, p. 127). Figures for college were 9 percent and 10 percent for the respective groups. Data are inadequate on the payoff from schooling to minorities and females in rural areas, but rates would probably be lower than indicated above because of inadequate local employment opportunities and other factors.

Redfern (1970) estimated the payoff from schooling for residents of 29 low income rural counties in the South based on data collected from 1,012 households in 1960. Social rates of return for white male nonfarm household heads were 18 percent for elementary school, 16 percent for high school and only 2 percent for college. For white male farm household heads, social rates of return averaged 6 percent for elementary school and only 1 percent for high school. The implication is that schooling above the elementary level had a low payoff for persons who remained on typical farms in the area. To realize a favorable return for their schooling, many people had to leave the community to obtain higher earnings. The private rate of return for high school was only 3 percent for farm white males who remained in farming in the community, and rates of return for farm blacks and females were probably lower. Schooling above the elementary level may have been a profitable investment for youth who leave the farm but not for the average farmer remaining in his home community.

Thus, the low levels of schooling attainment so common in depressed rural areas seemed rational by economic standards for those planning to farm in the 1960's.

Other studies report low economic payoffs from Head Start and other compensatory education programs designed to uplift the disadvantaged. Ribich (1970, p. 226) summarizes:

> The calculations indicate some interesting differences in payoff rates among various types of programs, but what was most interesting was the generally low ratio of estimated total income gains that appeared (on average) for each basic type of educational change considered. The typical relationship was for income gains to be around 60 percent of costs.

Rates of Return on Vocational-Technical Education Results of numerous studies of payoff from vocational-technical education are reported by Tweeten and Brinkman (1976). They concluded (p. 120) that:

> The success of programs increases as they serve less disadvantaged clientele. The Job Corps and WIN programs are not very successful and have low placement rates (20 percent) and a rate of return on investment near zero; the MDTA serves a less disadvantaged group and has placement rates of 50 percent and a rate of return on investment averaging roughly 15 percent; and, finally, the largely state-run vocational-technical programs that train typical youngsters (not retraining disadvantaged) have placement rates of 75 percent and a social rate of return on investment averaging perhaps 20 percent. Economic efficiency of the WIN and Job Corps programs is so low they must be justified mainly on equity grounds--as transfer payments to the poor rather than as efficient sources of future earnings. Placement rates and investment return rates vary widely among institutions, years, and areas, however, for each of the above programs.

Finally, data reveal that children of parents with high education receive on the average less schooling than their parents; children of parents with low schooling attainment receive more education than their parents. Thus there is movement to an equilibrium level of schooling, about 14 years for males according to Tweeten (1967, pp. 33-37). His estimated growth model of education was based on data showing that the average child received .5 more years of schooling than their fathers but

children of heads with 8 years of schooling received 12 years of schooling, or 1.5 times the family head's education. This same relation seemed to hold based on more recent data from low income, low education, rural counties of the South, where "black males have attained an educational mean level 1.6 times higher than their fathers; for whites the corresponding increase was 1.5" (Cosby and Charner, 1978, p. 96). Because low income rural counties of the South seem to be on the rapid gain portion of the educational track, we can expect sizable schooling and income gains for these areas in long-term perspective.

Impact of Education on the Level and Distribution of Income

The role of education in rural development is placed in clearer perspective by examining its impact on income. Based on rates of return shown earlier, additional schooling beyond that shown for metro residents may not be economically justified, and at 12.6 years for white males is near the equilibrium level computed by Tweeten (1967, pp. 33-37). The assumption made in the following analysis is that each race-sex category of nonmetro residents can economically justify raising its schooling levels to that of its respective metro counterpart. Further earnings gains are possible only by eliminating discrimination and other impediments to added earnings for minorities and females. Table 2 contains estimates of the potential contribution to earnings from alleviating differences in schooling and other factors among sectors, races and sexes.

White males White nonmetro nonfarm males lag their metro counterparts in median schooling by only .4 years. Eliminating this lag would add an estimated $400 to nonmetro white male earnings based on earning power in

Table 2. Mean earnings and earnings gap in 1973 for persons 25 years of age and older by sector, race and sex.

Sector	Race and sex			
	White		Black	
	Males	Females	Males	Females
	Dollars per person			
Metro (Actual)	11,500	5,800	8,200	4,900
Nonmetro nonfarm (Actual)	10,500	3,900	4,100	2,100
	(%)	(%)	(%)	(%)
Gap	1,000 (100)	7,600 (100)	7,400 (100)	9,400 (100)
Attributed to:				
Education (quantity)	400 (40)	100 (1)	2,450 (33)	1,150 (12)
Sector	600 (60)	1,800 (24)	1,650 (22)	1,650 (18)
Sex	0 (0)	5,700 (75)	0 (0)	3,300 (35)
Race	0 (0)	0 (0)	3,300 (45)	3,300 (35)
Nonmetro farm (Actual)	9,800	3,900	3,650	1,200
	(%)	(%)	(%)	(%)
Gap	1,700 (100)	7,600 (100)	7,580 (100)	10,300 (100)
Attributed to:				
Education (quantity)	1,100 (65)	100 (1)	2,900 (37)	2,050 (20)
Sector	600 (35)	1,800 (24)	1,650 (21)	1,650 (16)
Sex	0 (0)	5,700 (75)	0 (0)	3,300 (32)
Race	0 (0)	0 (0)	3,300 (42)	3,300 (32)

Source: Basic data from U. S. Bureau of the Census (1975, p. 10).

nonmetro areas. If this additional schooling in nonmetro areas is combined with earning power in metro areas, an additional $600 is added to nonmetro nonfarm male earnings. Thus of the $1,000 shortfall in mean earnings of nonmetro nonfarm males below white metro males, an estimated 40 percent is due to quantity of schooling and 60 percent to quality of schooling and other factors (including age) affecting earning power for a given education. Correcting for schooling quantity differences would raise earnings of white nonmetro nonfarm males by only 4 percent. The potential contribution to earnings of farm white males is higher--bringing median schooling of the group to the level of their metro counterparts adds an estimated 11 percent to earnings.

Black males Black nonmetro nonfarm males lag their urban counterparts in median schooling by 3.5 years. Bringing median schooling to a par with metro black males would raise earnings of nonmetro nonfarm black males an estimated $2,450. Bringing earnings power per year of the higher level of schooling to the level of metro black males would raise earnings another $1,650. Of the discrepancy in mean earnings of $7,400 between black nonmetro nonfarm males and of white metro males, 33 percent is accounted for by schooling quantity, 22 percent by less earning power (due to age, lower quality of education, lack of jobs) and 45 percent by discrimination, attitudes and/or ability. Schooling accounts for a small portion of the total gap (it would explain more if indirect effects of schooling on mobility and other factors were considered); still, bringing median education of nonmetro nonfarm black males to the level of their urban counterparts could raise earnings by an estimated 60 percent. Figures for black farm males are somewhat comparable. It is cautioned that these estimates only bring schooling of nonmetro blacks to the level of metro blacks. If discrimination

and other elements associated with factors accounted for by "race" in Table 2 were eliminated, then schooling of blacks to the whites metro level could be economically warranted and a larger proportion of the earnings gap would be closed by education.

White Females White nonfarm nonmetro females lag substantially in earnings behind their metro counterpart. Quantity of education as measured by median schooling attainment is not the source of the lag. The major factor accounting for the $7,600 shortfall of nonmetro nonfarm white female income below income of metro white males is sex (75 percent). Sector accounts for 24 percent and median schooling about 1 percent. The large difference associated with sex is the result of the traditional female occupational roles, discrimination, ability and/or unavailability of jobs in nonmetro areas. Patterns for farm and nonfarm nonmetro females are similar.

Black Females Black nonmetro females had the lowest earnings among categories in Table 2. Bringing schooling attainment to the level of their metro counterpart would raise estimated earnings of black nonmetro nonfarm females $1,150 and of black farm females by $2,050, a sizable percentage gain; yet, earnings would fall far short of those of the norm--white metro males. Of the $9,400 shortfall for nonfarm nonmetro black females, 12 percent is accounted for by low median schooling, 18 percent by lack of female earnings power in nonmetro versus metro areas, and 35 percent each by race and sex. Results are somewhat comparable for black farm females, but a larger percent is attributed to lack of schooling. The selectivity of migration toward the young and most educated probably biases upward the sector component for farm categories.

Table 2 accounts for only the direct effect of schooling. Schooling interacts to an unknown degree with the sector, race and sex dimensions.

For example, discrimination would probably be less if educational differences were less among sectors and races. Although schooling is generally overshadowed by sector, occupation, race and sex as a factor explaining mean earnings differences, it would play a larger role if all interactions were accounted for.

Variance in Schooling and Earnings

While economists have emphasized the contribution of schooling to the level of earnings, sociologists have emphasized the contribution of background and other factors to the variance of schooling attainment and also the contribution of schooling to variance of income.

Regarding achievement test scores, Jencks et al. (1972, p. 109) concluded from extensive analysis that:

> 1. If we could equalize everyone's genes, inequality in test scores would probably fall by 33 to 50 percent.
>
> 2. If we could equalize everyone's total environment, test score inequality would fall by 25 to 40 percent.
>
> 3. If we merely equalize everyone's economic status, test score inequality would fall by 6 percent or less.
>
> 4. Equalizing the amount of schooling people get might reduce cognitive [i.e., knowledge as measured by achievement tests in reading, mathematics, etc.] inequality among adults by 5 to 15 percent.
>
> 5. Equalizing the quality of elementary schools would reduce cognitive inequality by 3 percent or less.
>
> 6. Equalizing the quality of high schools would reduce cognitive inequality by 1 percent or less.
>
> 7. Eliminating racial and socio-economic segregation in the schools might reduce the test score gap between black and white children and between rich and poor children by 10 to 20 percent.
>
> 8. Additional school expenditures are unlikely to increase achievement, and redistributing resources will not reduce test score inequality.

Equalizing the quantity and quality of elementary and secondary schooling would reduce cognitive inequality by only 5 to 19 percent. In general these results are consistent with other studies (Tweeten et al., 1974; Cosby and Charner, 1978) which found background and ability of students rather than schooling inputs account for most of the explainable variation in schooling attainment.

Schooling inputs account for an even smaller proportion of the variation in income than in schooling achievement in the nation. According to Jencks et al. (p. 226), "when we compare [income of] men who are identical in all these respects [family background, cognitive skill, educational attainment and occupational status], we find only 12 to 15 percent less inequality among random individuals." Sewell and Hauser (1972, p. 855) using extensive data on background, ability and educational attainment accounted for 7 percent of the 1967 variation in earnings of males who graduated from Wisconsin high schools in 1957. The conclusion from the evidence above and elsewhere (Chiswick and Mincer, 1972) is that equalizing schooling quality and quantity would have a minor impact on income inequality in the U. S. Low income rural areas and blacks can improve their economic positions by greater education. But much of the overall inequality in income would remain because only that among groups would be alleviated--within group inequality is much larger and would continue. It is also well to note that equal educational attainment, even if technically possible, is not economically justified. The economics of education indicates that providing schooling to each individual to the point where added benefits just cover added costs would result in quite unequal schooling attainment and income among individuals--the perennial equity-efficiency dilemma.

Impact of Schools on Community Employment and Income

Thus far, attention has focused on the impact of schooling on the individual. The literature is far less complete on the impact of schooling on the community employment and income. The impact is partially apparent in industrial firm location decisions.

Industry Location Factors A review (Tweeten and Brinkman, 1976, Ch. 8) of dozens of studies of factors considered important by managers in selecting a community for the location of industrial plants revealed prime importance of local markets, labor, raw materials and transportation. None of the studies listed "good schools" as an important factor. However, education is an indirect factor because managers presumably are interested in the quality (as influenced by schooling) as well as quantity of labor.

Education and Community Growth In another approach, researchers studied the relationship of community factors to actual changes in income, employment and population. Smith, Deaton and Kelch (1978) estimated the probability of manufacturing plants locating in rural communities based on data for 565 nonmetropolitan communities, 179 of which had one or more plants established during the 1970-73 period. Greater educational outlays significantly increased the probability of a plant locating in the community: each dollar increase in federal, state and local allocations per student in average daily attendance in the county increased the probability of a plant locating in a specific community by .0004. The study showed opportunities to compensate for other factors such as access to an interstate highway about which the community had little control. A $161 increase in annual expenditures per pupil increased the probability of firm location by the same amount as access to an interstate

highway. The presence of a college in the community increased the probability of a firm locating by .14.

Murray (1978) used discriminant analysis to differentiate between communities with high and low rates of growth in per capita income between 1969 and 1972 in communities in Oklahoma and Arkansas. Median educational attainment was higher in counties with high per capita income. However, communities with more rapid rates of growth in per capita income had lower mean educational levels. Lower income communities were catching up but the role played by education in this process is not known.

Using data obtained in the late 1960's from 250 job development projects sponsored by the Economic Development Administration (EDA), Smith and Tweeten (1978) examined factors which influenced the EDA cost per job generated in projects successful in attracting at least one manufacturing plant as well as the probability of attracting a plant. Mean schooling levels did not influence significantly the probability of success in attracting a firm but did influence significantly jobs generated per $1,000 of outlays in successful projects. Spending EDA industrial development funds in a community with residents possessing on the average one standard deviation (1.4 years) less schooling <u>increased</u> the number of jobs created per $1,000 outlay by .2. Cost to the EDA per job generated was lower (1) in predominantly blue-collar than in white-collar communities, (2) where local government expenditures per capita were low, (3) where the proportion of elderly in the population was low and (4) in Appalachia. Each of these considerations indicate attractiveness to

firms of a low-wage labor force. However, it is important to recognize that the EDA focused on job creation in regions characterized by high unemployment, hence is not representative of all industrial location experience.

A principal motive for firms locating in rural areas is reduction of production costs, which often means utilization of low-cost labor. Workers are often attracted from outside, particularly to supply skilled labor and administrative talent. The in-movers tend to have more education than the local population on the average. Data on schooling attainment for 1970-75 reveal that whereas 18.2 percent of SMSA white nonmovers (and 27.9 percent of non-SMSA nonmovers) had 8 years or less of schooling, 12.4 percent of white movers from SMSAs had this level of schooling (Fratoe, 1978, p. 33). Whereas 12.2 percent of the SMSA white nonmovers (and 7.6 percent of non-SMSA nonmovers) had 4 or more years of college, 17.7 percent of the white SMSA residents who moved to nonmetropolitan areas had this level of educational attainment. Outmovement from nonmetro to metro areas was even more selective toward those with more schooling than was outmovement from metro to nonmetro areas. For example, 24.5 percent of white nonmetro movers to metro areas had 4 or more years of college compared to 17.6 percent of the white movers from metro to nonmetro areas. Patterns were similar for blacks, although percentages of movers with more education were lower for blacks than for whites.

The average nonmetropolitan migrant to SMSAs had about one more year of schooling than the average SMSA migrant to nonmetropolitan counties. Hence equal numbers of migrants in both directions would transfer human capital in the form of schooling investment to SMSAs from non-SMSAs. But in light of lower schooling costs in nonmetro counties and the far larger stream of migrants from than to SMSAs since 1970, the net flow of human capital is now to nonmetro counties.

This represents a considerable turnaround from earlier years. For example, from 1960 to 1970, net migration out of nonmetro counties totaled 3 million while net migration into metro counties totaled 6 million (Beale 1975, p. 6). This represented a capital outflow in the form of local investment in schooling of about $20 billion from nonmetro areas to metro areas.

Net movement of 40 million farm residents to cities from 1930 to 1973 represented a massive transfer of capital from frequently depressed farming communities to cities. At $6,000 in rearing costs, including schooling paid by property taxes and parents, the net capital flow to cities was $240 billion (Tweeten and Brinkman, 1976, p. 13). These costs were largely uncompensated and fueled further deterioration of many already depressed rural communities. Farm outmigration is down considerably from earlier years, and the demographic turnaround means that the inequities created by population movements will become less onerous for agricultural areas.

The above data can be compared with data on community economic benefits from industrialization to explain why communities often emphasize job creation rather than investment in human resources to improve the local economy. Shaffer and Tweeten (1974, p. 21) estimated that community economic benefits exceeded costs per job created by an average of $24,536 based on a 10-year earnings horizon in a low income area of Oklahoma. Faced with the choice of improving education and having the local investment of property taxes of $6,000 per outmigrant exit from the community versus attraction of a firm that would add $24,536 of net economic benefits per job to the community, which strategy for development would the local community prefer? One purpose of changing school funding procedures discussed later is to more nearly align the interests of the community and society as a whole in human resource investments.

Optimal Programs in a Rural Development Policy

What is the optimal level and mix of public programs to alleviate problems of depressed rural areas? Nelson and Tweeten (1974) simulated the impact of a wide ranging set of possible development programs to alleviate poverty and underemployment in a low income, high underemployment economic development district in eastern Oklahoma. An estimated 40 percent increase in development funds over past levels alleviated poverty and underemployment when applied through a 15 year period. Because of the large number of unemployable poor, most of the funds went to welfare (transfer) payments to the poor. Although publically assisted labor mobility programs to move the underemployed (including unemployed) workers to jobs outside the district was the single most cost-effective program to alleviate underemployment, many of the workers returned to be underemployed in the sending district. Consequently, development programs to promote job creation (e.g. by federal tax writeoffs from corporate profits) coupled with incentives to hire disadvantaged workers was the key to alleviating underemployment. Programs of improvement in general education and vocational-technical training were cost-effective and economically efficient but were shallow--they neither cost very much nor did they have much impact in the period considered on poverty and underemployment.

A more comprehensive model by Smith (1977) simulated the outcomes from development funds devoted to industrialization, education, training and welfare for three economic development districts in Oklahoma. These districts ranged from low income and high underemployment to relatively high income and low underemployment. The results from the 15-year simulation runs again indicated a key role of industrialization. With a given development budget,

unemployment and poverty were lower and employment and per capita income were higher at the end of a 15-year period with programs emphasizing job creation through industrialization rather than education and training. The least favorable outcomes arose from allocation of funds strictly for human resource development programs. The most successful policy of all as measured by discounted income benefits relative to discounted costs emphasized industrial development but with up to 50 percent of development funds devoted to education. Human resource programs work best when accompanied by programs to provide jobs locally or assist workers to obtain jobs outside the district.

Although not fully accounted for in the model, job development seemed to influence schooling more than schooling influenced job development. Schooling attainment improves because of the influx of more educated outsiders with greater incomes, socio-economic status and a broader perspective on community service needs coupled with the greater demand for education by natives with higher incomes generated by rural development. Thus interaction of job development with human resource investments constitutes the whole of economic progress in rural development. It emphasizes the need to view rural development as an integrated process and warns against too much emphasis on improving schooling alone as the solution to problems of poverty and underemployment.

IMPROVING RURAL SCHOOLS

Studies of schooling input-output relationships agree that the principal predictors of student achievement are socio-economic background of the student and inherent ability--school quality accounts for about 5 percent of variation

in student outcomes as measured by achievement test scores. But because schooling is one of the few opportunities to intervene in the socio-economic growth process, improvement in schooling quality deserves our best efforts. Human capital studies reported earlier showing rates of return and contributions to income from schooling provide no insight into specific means for public policy to improve the quality and quantity of education. Other types of studies provide some but by no means exceptional insights.

Improving School Quality

The Rand Corporation (Averch et al. 1971) reviewed a large number of studies based on the massive Equal Education Opportunity Survey and Project Talent as well as numerous controlled experiments in schooling techniques, processes, and practices. The report concluded that parents' income, education, and occupation are the consistent, significant predictors of student outcomes. No consistent and significant evidence indicated that teachers with more experience, more degrees, and more salary are more (or less) effective in producing favorable student outcomes. There was no consistent evidence that expensive facilities and equipment, live teachers (compared to television), smaller classes, team teaching, ability grouping, track systems, desegregation, enlarged curriculum, individualized instruction, computerized instruction, or decentralization of school control will raise (or lower) student outcomes. Private contractors, who presumably are free to discard old myths and obsolete practices, hired to run schools had little more success than public school administrators in managing for

more favorable outcomes. Results pointed to no single practice that consistently produced favorable outcomes.

More recent studies utilizing educational production functions relating student achievement scores to schooling input and other variables provide some positive though not necessarily consistent results. Utilizing data from a random sample of all Oklahoma public elementary and secondary schools, White and Tweeten (1973) found that teachers with 3-9 years of experience were more successful in improving achievement scores than were teachers with more or less experience. Smaller classes raised achievement scores in mathematics and language arts in elementary school but not in high school after adjustment for student background and other variables. Larger schools detracted from achievement, other things equal. But for a given outlay per student, larger schools were able to contribute more to achievement because they were able to realize economies of size in use of schooling inputs. Higher teacher salaries had no consistent impact on achievement scores but significantly increased attendance rates after controlling for student background and other variables.

Recent research from Debertin (1976; 1977) based on educational production function for North Dakota in 1968-69 and Indiana in 1971 support the results of earlier studies and indicated that only a small portion of the variation in schooling achievement was accounted for by school inputs. Most was accounted for by factors outside of school. He (1976, p. 34) reported that "findings from both studies provided only minimal evidence to support the belief that standardized test scores might be increased, or performance of students might be improved through increased funding of local schools." Debertin (1977, p. 40) concluded that "the fundamental

finding of the analysis is that local public schools are indeed a product of a community."

Wolfe (1977) and Summers and Wolfe (1977) used data from the Philadelphia school district for 1970-71 to estimate educational production functions. Results indicated low-achieving students made most progress in classes with less than 28 students whereas high-achieving students did better in larger classes. Smaller schools appeared to be better for all students, but had a larger beneficial effect on achievement growth for black pupils. More library books per pupil had a perverse effect on achievement scores. Low-achievers benefited from having teachers who attended higher-rated undergraduate institutions. High-achievers gained from having teachers with more experience. Neither physical facilities nor teachers with higher National Teacher Exam scores or education beyond a Bachelor's degree had a significant impact on student achievement.

Link and Ratledge (1975) estimated the payoff from expenditures to improve the quality of education based on data from the National Longitudinal Survey of the Labor Force gathered during 1968, using a sub-sample of 1,157 young black and white males ranging in age from 16 to 26 years. Their results confirmed those of earlier studies which showed diminishing returns to additional annual expenditures per student. A 1 percent increase in total expenditures caused an 8.53 percent increase in annual earnings of blacks and a .16 percent increase in annual earnings of whites. These findings suggest that increases in educational quality have been an important cause of relative gains in black earnings during the decade of the 1960's, but do not indicate specific schooling practices associated with the gains.

Analyzing four large educational data sets, Klitgaard and Hall (1975) identified schools in Michigan districts that consistently produced outstanding students, even after socio-economic factors were controlled. Outstanding schools had smaller classes, better paid teachers and more teachers with greater than 5 years experience. Most of the outstanding schools were rural and all white. It is cautioned that the data revealed no evidence of extreme overachievers but only showed some evidence of unusually effective performers.

Mare (1978-79), analyzing educational growth at the national level based on data from the 1973 Occupational Changes in a Generation Survey and other sources, found that higher teacher's salaries and instructional expenditures significantly raised schooling attainment. Students who averaged more days in school annually were more likely to continue schooling. Above average labor market returns to education and rising overall unemployment were associated with high school students missing fewer days of school and rising probability of graduation. Consolidation of schools tended to improve rates of elementary school completion. But the number of institutions of higher education appeared to play no significant role in college entry rates (p. 12). This study suggests the hypothesis that additional funding of schooling contributes to earnings primarily by increasing the quantity as opposed to the quality of schooling.

Improving School Quantity

According to Ribich and Murphy (1975, pp. 73-74), spending more on education gives rise to increased earnings mainly through the indirect effect of increasing years of educational attainment based on analysis of extensive data from Project Talent and follow-up surveys.

In his analysis of the More Effective Schools program in New York, Fox (1967) found that year-round school programs for students from disadvantaged communities allowed them to progress academically at rates comparable to youth in communities where non-school employment and learning opportunities are more abundant.

Using data from the Equality of Educational Opportunity Survey, Wiley (1976) noted substantial variation among schools in attendance rates, hours per day of operation and in days of operation per year. After adjusting achievement scores for the background of students, predicted achievement scores increased more than proportional to the quantity of schooling. Increases in the quantity of education obviously merits serious attention by educators, legislators and their constituencies.

School Funding

Based on the numerous studies reported above, specific programs and practices that could be encouraged by public policies to consistently enhance the quantity and quality of education are not easily identified. Results do not relate specifically to rural schools. Nonetheless, opportunities to improve schooling clearly exist and some alternatives are promising such as summer terms and smaller classes for disadvantaged students. Many improvements are unique to local circumstances. A feature important to a number of improvements is adequate funding. Many rural schools are too small to realize economies of size, and some resources can be freed to finance schooling improvements by consolidation of schools in rural areas (White and Tweeten, 1973). But the issue of financial support deserves further treatment--funding can be made more equitable and efficient among schools.

Inequity Among Income Levels Holland (1973, p. 75) estimated for Oklahoma that combined local, state, and federal taxes supporting common schools were in total nearly proportional to family income over nine income classes in 1961. Taxes in Oklahoma were near the mean for all states in regressivity, hence Oklahoma results may be somewhat representative. Public expenditures (and taxes paid in parentheses) for schooling per family averaged $216 ($109) for families with incomes of $2,000-$3,000 per year and $281 ($551) for families with incomes of $10,000-$15,000. The poorer families received a net transfer payment of $107 and the richer families experienced a net tax of $270. Holland implicitly assumed a zero return on schooling investment. If account is taken of the high rate of return on elementary education expenditures, benefits based on actual earnings distributed income even more favorably toward lower income families. Based on his own Oklahoma study as well as four additional studies of other geographic areas, Holland (1973) concluded that taxes and benefits from public elementary and secondary schooling in general redistribute income from the rich to the poor.

Common schools have promoted income equality as an increasing proportion of youth from low income families have finished high school. The amount redistributed are not large relative to incomes, hence the results do not conflict sharply with conclusions reported earlier that equalizing educational attainment would not markedly reduce variance in the distribution of income. The fact that progress will be slow in raising the proportion of students completing high school above the current 80 percent reduces future chances to accelerate movement toward equality, but financing a greater proportion of common schools through federal funds (obtained through progressive taxes) enhances opportunities for equity.

While public elementary and secondary schools promote income equality, public higher education has a very different impact. Studies for California, Florida and Wisconsin (cf. Tweeten and Brinkman, 1976, Ch. 5) found that the regressive state taxes combined with a higher proportion of students from higher income than from low income families using the most expensive higher education facilities redistributes income from non-users to users and from low income to high income families. Reforms in financing of higher education could take several forms. One is to provide a flat grant to all youth to be used for higher education or whatever other investment they see fit, such as starting a business. This approach would alleviate the user-non-user equity problem but would be expensive and regressive if financed by the typical current state tax system. A second alternative is to raise tuition to full cost levels at public institutions of higher education and use subsidies to finance tuition grants or low interest loans to needy students. A third proposal is low or zero tuition, coupled with a surcharge on future earnings. Higher education alumni would pay a tax to the state to repay the public cost of higher education, and this tax could be proportional to earnings. Persons with no earnings would pay back nothing; persons with high earnings would pay back more than the cost of their higher education. Rural residents with low incomes would benefit from such funding reforms.

Geographic Inequity The above data do not account for geographic inequities in school funding. Some elements for "ideal" funding of common schools were illustrated by Hines and Tweeten (1972) for U. S. census divisions in school year 1959-60. Three adjustments were made in actual funding to arrive at ideal or optimal funding. The first corrected for ability to invest--each division made an equal effort defined as a given percent of state and local income for common schools, adjusted for the proportion of population in public schools but

holding constant total state and local school expenditures in the nation as a whole. Second, each division was compensated for net spillovers, defined as net outmovement of state and local schooling investment through migration. Divisions with a net spillout received compensation from divisions experiencing a net spillin of schooling benefits, with total net spillouts equal to net spillins. The final dimension of optimal funding was to reach the overall efficient funding level, $644 per student.

The optimal model suggested that the South Atlantic division increase its funds (state and local) for schooling by 22.7 percent, the most of any division. The model also called for an increase in state and local funds in the Mountain (22.5 percent), Pacific (21.9 percent), East North Central (3.6 percent), and East South Central (3.6 percent) divisions. At the other extreme, the model called for the Middle Atlantic division to decrease its funds for schooling by one-fifth, largely because of past overachievement in funding relative to income but also because of a net spillout of schooling benefits. The large decrease, 17 percent, called for in the West North Central division resulted mainly because of spillout of schooling investment through migration. Other divisions reducing state and local expenditures from schooling under the optimal model included the West South Central (3.3 percent) and New England (2.7 percent).

Optimal federal outlays were the difference between the efficient expenditure, $644, and optimal divisional expenditures. The actual average federal support per student was $42 in the Pacific division compared to $22 in the less affluent, high-spillout East South Central division. The optimal model called for a federal outlay per student of $360 for the latter division and a "rebate" of $24 from the Pacific division to the federal government. Federal outlays increased from the actual 5 percent of all funds

for elementary and secondary education in 1959-60 to 27 percent of all funds under the optimal formula, an increase of nearly $6 billion.

The divisional externalities and inequities measured above overlook externalities and inequities among states, counties, and communities. Economically depressed rural counties and communities have historically incurred spillouts of schooling benefits through outmigration of young, educated youth, and would gain revenues from outside sources if appropriate formulas were applied.

Migrants and their embodied educational investment are attracted to high income areas, hence spillovers tend to redistribute wealth regressively. The impact of spillovers on willingness to provide local financial support for schools is of concern. It might be expected that net spillouts discourage state and local schooling investment because local benefits are reduced relative to costs. While parents want their children to receive a sound education whether they leave or remain in the community, other taxpayers cannot necessarily be expected to take the charitable view. One behavioral assumption is that communities ignore schooling investment spillins when making schooling output decisions, hence are likely to underinvest. Communities would be less likely to underinvest if they consider benefit spillins and school aid spillins from federal and state sources. Communities may even compete by investing in schools for the location preferences of educated persons. Under such circumstances, spillovers could cause overall schooling investment to exceed the economically optimal level.

To resolve the issue, recourse must be made to empirical findings. Weisbrod (1964) found that net outmigration reduced local effort to fund schooling. Holland (1972) did not find that gross outmigration, gross inmigration, or net migration influenced local school fundings in

Oklahoma. One reason is that state funding formulas mandate local effort that is not easily circumvented. The empirical evidence suggests that the case for compensation of net spillovers rests quite securely on equity grounds and less securely on efficiency grounds.

Replacing the Local Property Tax In the Serrano versus Priest decision, the California Supreme Court ruled that the state school finance system "invidiously discriminates against the poor because it makes the quality of a child's education a function of the wealth of his parents and neighbors ... and therefore must fall before the equal protection clause" (see Coons et al., 1970). The decision and subsequent events have prompted a reexamination of schooling funding in many states.

On the average, common public schools receive about half of their funding from local sources, two-fifths from state sources, and one-tenth from federal sources. Discontent with school financing focuses primarily on the local property tax, which provides four-fifths of locally financed school revenues. Compared to poor districts, wealthy districts provide more revenue per student with less tax effort as measured by tax rates. Because their real property values are large relative to income, farmers are hit especially hard by property taxes. Property taxes have been criticized for being unresponsive to needs by failing to rise as fast as income and for taxing regressively.

The Oklahoma experience sheds light on sources of inequality in school funding. In school year 1976-77, the inequality in total funding of common schools per student in average daily attendance (ADA) was .0827 as measured by the Gini coefficient which ranges from a value of 0 for perfect equality (equal spending per ADA) to 1 for perfect inequality (Drummond, 1978,

Table 1). State aid is allocated by a modified Strayer-Haig foundation grant system designed to equalize total school funding among districts. Equalizing state aid would increase the Gini coefficient to .1098, hence state aid reduces inequality in total funding per ADA by nearly one-third. Equalization of local funding per ADA would reduce the Gini ratio to .0792, a 4 percent reduction in inequality from actual funding.

Federal aid accounted for approximately one-tenth of common school funding and originates from a variety of special programs for disadvantaged and exceptional children and for districts impacted by military installations. Federal aid would be expected to reduce inequality in school funding by providing more funds per ADA in low income districts than in high income districts. Thus it is notable that federal funds actually increased inequality. Equalizing federal funds per ADA among districts would reduce the Gini ratio to .0729, a reduction of 12 percent in inequality. Thus among the three sources of common school funds, federal funds constituted the largest source of inequality!

Drummond also disaggregated sources of inequality in local funding. Of particular interest to rural areas is differential assessment ratios for farm property, which in Oklahoma has been assessed at less than half the ratio to market value compared to the ratio for residential, commercial and industrial property. Yet inequality in local funding was estimated to increase if all property were assessed at the same ratio. The reason is that districts with much farm property on the average have a large property base per ADA which provides substantial local funding even with low assessment ratios. This finding would suggest merit for property taxes collected by the state at a uniform assessment ratio to current market value and returned to

districts in equal amounts per student. A problem with this or any approach based on real property is that ability to pay is a function of human capital and financial assets as well as real property and may more appropriately be measured by income in the absence of willingness or ability to tax all forms of wealth. Because farmers have lower ratios of income to real property than do other sectors, they have a major stake in school funding equalized according to income rather than property.

On the average, the most rural quintile of Oklahoma counties received state aid of $234 per student in 1973-74. If all counties were assessed equally in proportion to market value of property and an adjustment were made for net spillout of schooling investment, the quintile of most rural counties would have paid $934 per student to the state to be dispensed as state aid to other counties (Lowrance and Tweeten, 1977, p. 35). In addition, these rural counties would have continued their local funding for schools at the actual 1973-74 level. If local income were used as the criterion for state aid, the quintile of most urban counties in Oklahoma would have received only $66 per student compared with actual state aid of $231 per student in 1973-74. The study clearly demonstrated that reliance on income as the measure of ability to pay would shift to urban residents a substantial burden for state aid to common schools in Oklahoma; if real property is the appropriate measure of ability to pay, the burden of supporting common schools would shift toward the most rural counties.

In summary, the school funding issue has been studied at length for Oklahoma as well as other states. Most studies aspire to no more than equal funding per student, adjustments in assessments to reflect market values, and comparable millage rates on market value across property classes, districts and the like. But it is impossible to be very enthusiastic about such

tinkering with the current system while continuing to view real property as an adequate measure of ability to pay, ignoring spillovers and viewing equal outlays per student as a worthy goal regardless of need. An obvious answer is full state and federal funding of schools, drawing especially from income taxes. Local districts would pay transportation costs and supplement school funding in other ways, but, except for transportation cost, a formula could be established to reduce state and federal funding (say) 75 cents for each dollar of local supplement. Based on the study by Hines and Tweeten, the federal share of all common school fundings would need to be approximately 30 percent.

The federal share could be financed to a considerable extent by earmarking for schools what is now general revenue sharing, a program difficult to justify on grounds of equity or efficiency. Formulas for allocating federal revenue sharing to schools would be changed to the criteria noted earlier. Local property taxes would be reduced and/or freed to finance local infrastructure, non-schooling services, government administration and functions now financed by general revenue sharing. A major criticism is that local control of schools would be sacrificed. State and federal aid to schools already appears to be large enough to influence schooling decisions when state or federal officials deem such influence proper. Thus full state and federal funding is not a radical new move toward state and federal control of public schools.

SUMMARY AND CONCLUSIONS

Measures such as years of school completed, functional illiteracy, grade retardation and percent of youth attending college indicate that schooling attainment in nonmetro areas falls shows of that in metro areas.

Discrepancies in schooling attainment for the most part disappear after adjustments are made for (1) migration patterns which moved many young and educated rural residents to metropolitan areas prior to 1970, and (2) lower initial socio-economic status of students and their parents in rural areas. After adjustment for these factors, it is not possible to say that rural school children on the average attend inferior schools or rank low in schooling attainment. To be sure, economies of scale preclude providing in rural schools the wide ranging programs and curriculum found in metropolitan schools. But rural schools probably face fewer discipline, drug, vandalism, truancy and other difficulties faced by metropolitan schools and most are of sufficient size to provide a solid program in basic education.

Deficiencies in rural schooling are primarily concentrated in low income areas and among minorities. The federal government can play a key role in developing remedial programs, student retention programs and supplementary funding to improve schooling quality and quantity. Data presented herein indicates that additional schooling can alleviate a sizable portion of the somewhat modest shortfall of white nonmetro male earnings below those of their metro counterparts. For females and black males, large shortfalls in earnings can be closed only to a small extent by schooling. To close the large gap in earnings for these latter groups and for low income rural areas, public policy must focus on ending race and sex discrimination in jobs, on job creation in depressed rural areas and on improved methods of funding schools. More equitable funding of public schools calls for a greater reliance on state and federal financial support of local schools.

The data are ambiguous on specific practices and procedures to emphasize in improving schools. While one can suggest greater emphasis on drill in the basics (reading, writing, mathematics), smaller classes and summer programs as possible areas of emphasis, the specific improvements needed in each school can often best be determined by local school officials, administrators, teachers and parents.

Because progress in schooling attainment depends so much on the socio-economic position of parents and communities, improving schools and overall well-being of rural people depends in no small part on a comprehensive national growth policy. Major elements for the federal government's role in such a policy are outlined below (cf. Tweeten and Brinkman, 1976, ch. 14).

1. Development programs are severely underfunded for rural areas in relation to metropolitan areas, especially in relation to need as measured by poverty, underemployment, substandard housing, dependency rates and health. To promote equity, a comprehensive income maintenance program is needed to provide the working poor with incomes at least as high as those on welfare, provide work incentives and family cohesiveness, align payments among states (adjusted for cost of living) and finally, shift more funding of social programs to the federal government in recognition that problems of poverty spill across state boundaries as people go where welfare payments are more generous and penalize rural areas which see local capital invested at great sacrifice in schooling exodus through migration to higher income states. Within this context, a case can be made for earmarking of federal general revenue sharing funds for public schools.

2. Programs in (1) above emphasize issues of equity; other programs need to emphasize efficiency in use of resources while restraining national inflation. A combination of too many programs and too few funds to promote

rural development has reduced the effectiveness of federal efforts. Programs are uncoordinated and cost-ineffective in meeting goals such as alleviating poverty and unemployment. Fragmentation is apparent, for example, in overlapping programs under the Rural Development Act of 1972 and the Economic Development Administration. A merging of overlapping programs is overdue. Opportunities to coordinate and consolidate federal education assistance programs were not studied in this report, but deserve attention.

3. Opinion polls of rural residents reveal their number one problem to be lack of employment opportunities. An adequate local economic base provides the means for rural residents to fund the level and mix of goods and community services they desire. Too many rural "development" programs subsidize specific services and communities based on the premise that all rural areas and commodities need assistance and that benefits will trickle down to the needy. For greater impact on alleviating socio-economic problems detailed in this report, more emphasis should be placed on programs to expand the economic base in rural areas and less should be spent on programs to subsidize rural services with the exception of education and welfare services which have externality arguments for federal funding. Assisting spatial services encourages energy efficiency and rural sprawl as middle and high income city people move to the countryside to take advantage of subsidized electrical, telephone, water, school bus, mail and roadway services.

4. For high cost-effectiveness, job development programs need to focus on expanding the economic base (a) through direct inducements to private industry and low income workers (wage subsidy), (b) in substate multi-county development districts with high underemployment, (c) in or near growth centers, generally cities of 20,000 or more population which have the diversity of labor skills and

services (e.g. utilities, housing, financial institutions, transportation, etc.) to provide self-sustained growth of jobs within reach of rural residents in the hinterlands, and (d) with sufficient federal job-generating assistance to bring development to a critical mass required for sustained growth.

5. Rural development can be divided into phases: organization, planning, implementation and funding. In general, too many federal resources have gone into organization and planning. Without adequate programs and funding, the organization and planning cannot be implemented. In a related issue, human resource development programs such as institutional and on-the-job training have also not been coordinated properly with job generating programs--the result is that vocational-technical programs have too often trained workers for jobs that do not exist.

6. Many federal programs such as minimum wage laws and employer contributions to social welfare programs have mitigated against employment of the young, minorities and the poor. These programs could be replaced by or coordinated with a wage or earnings supplement program to increase employment, utilize underemployed workers, raise incomes of the working poor, and in general promote full national employment with fewer inflationary pressures than arise from excessive expansion of the money supply and deficit spending.

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